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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,268	04/11/2001	Nathan Jacob Litke	01339.0005.NPUS02	3516

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EXAMINER	
SEALEY, LANCE W	

ART UNIT	PAPER NUMBER
2671	7

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/833,268	LITKE ET AL.	
	Examiner	Art Unit	
	Lance W. Sealey	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7 October 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *9-17, 18/9, 19/9, 20/9, 21-25, 26/9, 27, 28/9, 29-32, 36- 37, 38/9, 39/9 and 40/9* is/are allowed.

6)☒ Claim(s) *1, 18/1, 19/1, 20/1,26/1, 28/1, 33, 35, 38/1, 39/1 and 40/1* is/are rejected.

7)☒ Claim(s) *2-8, 18/4, 19/4, 20/4, 26/4, 28/4, 34, 38/4, 39/4 and 40/4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification of Multiple Dependent Claims in this Office Action

1. A shorthand notation has been used to specify the multiple dependent claims in this Office action. For example, if claim 28 depends on claim 26 which depends on claim 20 which depends on claims 1, 4 or 9, the multiple dependent claims for claim 28 will be characterized simply as 28/1, 28/4 and 28/9, not 28/26/20/1, 28/26/20/4 and 28/26/20/9.

Allowed and Allowable Subject Matter

2. Claims 9-17, 18/9, 19/9, 20/9, 21-25, 26/9, 27, 28/9, 29, 30-32, 36-37, 38/9, 39/9 and 40/9 are allowed, and claims 2-8, 18/4, 19/4, 20/4, 26/4, 28/4, 34, 38/4, 39/4 and 40/4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

3. The following is a statement of reasons for the indication of allowable subject matter: No prior art anticipates or suggests, in a method of subdividing a first mesh representation of an object surface bounded by one or more boundary curves to form a second subdivided mesh representation, detail vectors (claims 2-3, 9, 21 and 34), subdividing the second mesh representation one or more times until any error between it and the object surface is less than a prescribed tolerance value (claim 4), determining the location of an interior vertex in the second mesh representation by weighting the locations of adjacent vertices in the first mesh representation and adding the weighted locations (claim 5), determining the location of a corner

vertex in the second mesh representation by setting it to the location of the corner vertex in the first mesh representation (claim 6), and determining the location of a boundary vertex in the second mesh representation by determining one or more parameters of a boundary curve corresponding to adjacent vertices in the first mesh representation, weighting the one or more parameters, and adding the weighted parameters to determine a parameter for the boundary vertex (claim 7).

4. Claims 18/4, 19/4, 20/4, 26/4, 28/4, 38/4, 39/4 and 40/4 are allowable because they depend on claim 4; claim 8 is allowable because it depends on claim 7; claims 10-17, 18/9, 19/9, 20/9, 26/9, 28/9, 38/9, 39/9 and 40/9 are allowed because they depend on claim 9; claims 22-25, 27, 29 and 30-32 are allowed because they depend on claim 21; claim 36 is allowed because it depends on claim 34; and claim 37 is allowed because it depends on claim 35.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 18/1, 19/1, 20/1, 26/1 and 33 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Eck et al., "Multiresolution Analysis of Arbitrary Meshes" ("Eck") in view of DeRose et al. ("DeRose", U.S. Pat. No. 6,489,960) and Sargent et al. (U.S. Pat. No. 6,271,861).

7. Eck, in disclosing a method for storing complex meshes in a simple, unified and theoretically sound manner, also discloses, with respect to claims 1 and 33, a method of subdividing a mesh representation of an object surface comprising a plurality of tessellated polygons, each of the polygons having one or more vertices; the method comprising:

- subdividing one or more of the polygons into child polygons, each of the child polygons having one or more vertices (1. Partitioning within the section "3 Overview of Remeshing"); and
- determining locations of the vertices of the child polygons (1. Partitioning within the section "3 Overview of Remeshing": "Identifying each of the m vertices or nodes of the triangulation" necessarily includes identifying the locations of the vertices.).

8. Eck does not disclose forming a second subdivided mesh representation. However, this element is disclosed by the DeRose method of hybrid subdivision at col.14, ll.25-30.

9. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Eck and DeRose methods. This would produce a more efficient modeling of objects (DeRose, Abstract, second sentence).

10. However, neither Eck nor DeRose disclose maintaining boundary vertices of the child polygons on one or more of the boundary curves. This element is disclosed by the Sargent

method of shading at col.5, ll.52-55 (The N by M patch is a child polygon of the parent single patch mesh; see ll.45-47).

11. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Eck-DeRose method with the Sargent method. Such a combination would help to define color regions across a gradient (Sargent, col.5, ll.20-27).

12. The other claims in this rejection will now be considered. With respect to claim 18/1, the mesh mentioned in the Eck "Overview of Remeshing" section is the representation of the object surface.

13. Concerning claims 19/1, 20/1 and 26/1, Eck impliedly discloses a memory/processor readable storage medium in the section marked "1 Introduction" where it is specified "such meshes are notoriously expensive to *store*" (italics added by examiner) and then "Multiresolution analysis offers a promising new approach for addressing these difficulties in a simple, unified, and theoretically sound way."

14. Accordingly, in view of the foregoing, claims 1, 18/1, 19/1, 20/1, 26/1 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eck, DeRose and Sargent.

15. Claim 28/1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eck in view of DeRose and Sargent and further in view of Konno (U.S. Pat. No. 6,198,979).

16. Regarding claim 28/1, neither Eck, DeRose nor Sargent disclose a CAD system. However, Konno discloses one in col.1, ll.15-19.

17. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Eck-DeRose-Sargent method with the Konno CAD system. Such a combination would give users control in designing complex free-form surfaces (Konno, col.1, ll.15-16).

18. Accordingly, in view of the foregoing, claim 28/1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eck, DeRose, Sargent and Konno.

19. Claims 38/1, 39/1 and 40/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eck in view of DeRose and Sargent and further in view of Stallings et al., Business Data Communications, Third Edition ("Stallings").

20. Regarding all three claims, Eck impliedly discloses a system with a memory/processor readable storage medium in the section marked "1 Introduction" where it is specified "such meshes are notoriously expensive to *store*" (italics added by examiner) and then "Multiresolution analysis offers a promising new approach for addressing these difficulties in a simple, unified, and theoretically sound way."

21. However, neither Eck, DeRose nor Sargent disclose a client/server system; this element is disclosed by the Stallings textbook at pp.408-410.

22. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Eck-DeRose-Sargent method with the client/server concept

described in Stallings. Such a combination would provide the flexibility to suit the needs of individual departments and users (Stallings, Table 14-3, p.415).

23. Accordingly, in view of the foregoing, claims 38/1, 39/1 and 40/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eck, DeRose, Sargent and Stallings.

Claim Rejections - 35 USC § 101

24. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

25. The claimed invention is directed to non-statutory subject matter. Claim 35 is rejected. A mere arrangement of printed matter (like "an object surface"), though seemingly a "manufacture," is rejected as not being within the statutory classes. See *In re Miller*, 418 F.2d 1392, 164 USPQ 46 (CCPA 1969); *Ex parte Gwinn*, 112 USPQ 439 (Bd. App. 1955); and *In re Jones*, 373 F.2d 1007, 153 USPQ 77 (CCPA 1967).

Response to Remarks

26. The examiner, persuaded by the applicants' assertion that Konno was not combinable with Eck and DeRose for the purpose of teaching the "maintaining boundary vertices..." element of claim 1, has withdrawn combining Konno to reject claim 1 and has replaced it with Sargent. However, the examiner is still combining Konno with Eck, DeRose and Sargent to reject claim 28/1 because there is a legitimate motivation for Konno to be combined with these references to

teach the CAD system of claim 28/1.

27. The applicants also asserted that the characterization of claims 26, 28 and 36 as multiple dependent claims depending on other multiple dependent claims by the examiner were in error. In response, the examiner has withdrawn the objection of the last Office action and examined these claims.

28. Finally, the drawings replacement sheet for FIGS.1A-1D filed 9 October 2003 have been approved by both the examiner and the draftsperson, but the concerns with FIGS.2, 3B, 4A and 9A-9D, detailed on the PTO-948 sent with the non-final rejection on 7 May 2003, still need to be addressed.

Conclusion

Any inquiry concerning this communication or earlier communications from the Office should be directed to the examiner, Lance Sealey, whose telephone number is (703) 305-0026. He can be reached from 7:00 am-3:30 pm EST Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

MS Non-Fee Amendment

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

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